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10/508,750	04/15/2005	Andrew Moore	P/63624	8353

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EXAMINER	
SMITH, JOSHUA Y	

ART UNIT	PAPER NUMBER
2477	

NOTIFICATION DATE	DELIVERY MODE
06/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/508,750	MOORE, ANDREW	
	Examiner	Art Unit	
	JOSHUA SMITH	2477	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9,10 and 13-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9,10 and 14-16* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ ~~Information Disclosure Statement(s) (PTO/SB/08)~~ Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/23/2010 has been entered.

- **Claims 9, 10 and 13-16 are pending.**
- **Claims 1-8, 11 and 12 are previously cancelled.**
- **Claim 13 is objected to.**
- **Claims 9, 10 and 14-16 stand rejected.**

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9, 10, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux et al. (Patent No.: US 6,317,416 B1) in view of Qiu et al. ("Measurement-Based Admission Control with Aggregate Traffic Envelopes", April 2001, IEEE Press, IEEE/ACM Transactions on Networking, Vol. 9, No. 2, pages 199, 200, 202, and 203) and Prasad (Patent No.: US 6,377,550 B1), hereafter respectively referred to as Giroux, Qiu, and Prasad.

In regards to Claim 9, Giroux teaches in column 3, lines 12-13, a connection admission controller computes the minimum bandwidth required for each service class (providing a communications network resource to a plurality of classes of use of a network, a different level of service being associated with each class of use).

Giroux also teaches in column 2, lines 11-24, a fair queue servicing arrangement in a multi-service class packet switched network, comprising a weighted fair queuing controller, and buffer means for receiving incoming packets in queues, characterized in that further comprises means for monitoring buffer usage for each queue, means for determining the bandwidth requirements of each class of service, and a service weights manager for dynamically modifying the weights of said weighted fair queuing controller means in response to said buffer usage and bandwidth requirements (a demand estimator for estimating a worst case effective bandwidth demand for each class, and a dynamic resource allocator for allocating to each class a proportion of a network resource, a proportion allocated being dependent on an estimated worst case effective

bandwidth demand for each class, and an allocation optimizing use of an available network resource while ensuring a level of service of each class is observed).

Giroux also teaches in column 2, lines 49-52, a service weight manager that dynamically modifies weights to be used by a WFQ Scheduler (a communications network element for providing to each class a proportion of network resource allocated to it).

Giroux fails to teach a demand estimator for estimating a demand by computing two demand estimates of effective bandwidth for two different timescales, one of the demand estimates determining a short-term burstiness within a traffic envelope, and an other of the demand estimates determining a long term variance between traffic envelopes.

Qiu teaches in the Abstract, page 199, and a goal of admission control is to support quality-of-service demands of real-time applications via resource reservation, and Qiu teaches in the second and fifth paragraphs of the Introduction, page 199, extant algorithms employ user-specific traffic parameters to estimate aggregate resource demands, but this reliance on each flow's traffic parameters can render statistical services difficult to deploy, and Qiu presents an implementation of an MBAC algorithm for multiclass networks with link sharing and a development of a new theoretical framework of aggregate traffic envelops (a demand estimator for estimating demand).

Qiu teaches in the second and third paragraphs of section A of part II, page 200, a goal of a measurement methodology is twofold, where, first, by measuring a maximal rate envelope of an aggregate flow, capturing (computing an estimate for) a short time-

scale (a timescale) burstiness (demand) of traffic, and where an envelope measures a short time-scale (a timescale) burstiness (demand) and autocorrelation structure of an aggregate flow (one of the demand estimates determining a short-term burstiness within a traffic envelope), and Qiu teaches in the second and fifth paragraphs of section A of part II, page 200, measuring a variation of an aggregate flow's rate envelope (demand) to characterize (compute estimate for) longer time scale (a second timescale) fluctuations in traffic characteristics, and where a measuring of variability of an aggregate envelope (demand) over certain time slots to characterize (compute estimate for) a variation of an envelope (demand) itself over longer time scales (a second timescale) (a demand estimator for estimating a demand by computing two demand estimates of effective bandwidth for two different timescales, one of the demand estimates determining a short-term burstiness within a traffic envelope).

Qiu teaches in second E of part III, page 207, a termporal correlation of successive traffic envelopes to capture traffic dynamics at time scales larger than that of an envelope and measurement window, and where successive traffic envelopes are correlated (and an other of the demand estimates determining a long term variance between traffic envelopes).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Qiu with the invention of Giroux since Qiu provides an algorithm for statistical services that overcomes the problems of algorithms that require acute reliance on each flow's traffic parameters and allows easier deployment of statistical services for applications that cannot accurately estimate their

traffic parameters when a flow is first established and for flows with rate variations over multiple time scales that are not adequately characterized by standard traffic models, which can be introduced into the system of Giroux to aid in guaranteeing a desired Quality of Service for a service class that is beginning to experience traffic and for a service class with rate variations over multiple time scales, improving the resource utilization efficiency in the system of Giroux.

Giroux fails to teach the greater of the two demand estimates giving the estimated worst case effective bandwidth demand, and a proportion allocated being dependent on the estimated worst case effective bandwidth demand.

Prasad teaches in column 6, line 53 to column 7, line 9, and in column 18, lines 47-67, and in column 19, lines 10-19, and in column 22, lines 23-51, and in FIGS. 1 and 6, a determination is made at the end of each measurement period, where multiple measurement periods are defined, such that shorter measurement periods are "nested" within longer periods, and the determination of the highest ABR flow rate plus (or minus) the surplus (or undersupply) bandwidth divided equally among the flows with the highest ABR rates is then determined from a sum of the actual cell rates of flows having a cell rate level faster than or equal to that associated with the expired measurement period, with the sum of saved cell rates obtained in a previous measurement period, for those flows associated with unexpired measurement periods, and FIG. 6 illustrates a exemplary set of nested measurement periods T_0, T_1, T_2, T_3 as may be used according to this second preferred embodiment of the invention, and in this example, measurement period T_2 includes four measurement periods T_1, and sixteen of the

shortest measurement periods T_0, such that M=4, and longer measurement periods T_k>3 may be generated in a similar manner, and measurement intervals of differing duration are used to improve the responsiveness of the flow control process for high cell rate ABR flows, while ensuring that sufficient time is provided to receive and process resource management (RM) cells for lower data rate flows, and preferably these measurement periods are "nested", such that the longer measurement periods are integral multiples of the shorter measurement periods, and an aggregate rate R_T of all flows F, at the expiration of measurement period T_{k^*}, may be approximated, and this approximation is an addition that is the sum of all current rate values R_k for levels k less than or equal to the level k* of the expiring measurement period k*, with all of the saved rate values SR_k for all higher levels k>k* (corresponding to measurement levels T_k not yet expired), and an estimate of the rates of flows F that have changed levels, and this estimate of the rates of changed-level flows is made by counting the differences between the saved and actual counts for each expiring level less than or equal to k*, each times the minimum rate RL_k for the associated level, and a bottleneck rate BR is then calculated using this approximation of aggregate rate R_T, and the bottleneck rate BR is then communicated by switch 8 (FIG. 1) to the source of flows F, as the value of the Explicit Rate (ER) field in backward-traveling RM cells associated therewith (two demand estimates of effective bandwidth for two different timescales, the greater of the two demand estimates giving the estimated worst case effective bandwidth demand, and a proportion allocated being dependent on the estimated worst case effective bandwidth demand).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Prasad with the invention of Giroux in view of Qiu since Prasad provides a switch and method that provides varying lengths of measurement periods for flows of differing cell rates, so that responsiveness and stability may both be optimized (see Prasad, column 6, lines 20-45), which can be introduced into the system of Giroux in view of Qiu to allow accurate and stable transmission packets according to service class and to ensure stable optimization of dynamic allocation of bandwidth across multiple classes.

In regards to Claim 10, Giroux teaches in column 1, line 62 to column 2, line 3, a method of fair queue servicing at a queuing point in a multi-service class packet switched network, wherein incoming packets are received in buffers and outgoing packets are scheduled by a weighted fair queue scheduler characterized in that real-time information of buffer usage along with the minimum bandwidth requirement is used to dynamically modify the weights of the weighted fair queue scheduler (a network resources comprises bandwidth of a communications channel fed by a network element).

In regards to Claim 14, Giroux teaches in column 3, lines 30-33, an Internet-like best effort service that compensates for low unitization of other service classes (a best-effort service is provided as a class).

In regards to Claim 15, as discussed in the rejection of Claim 1, Giroux teaches network data traffic.

Giroux teaches in column 1, lines 28-29, CBR service is the only service that guarantees a bound on delay, and it is used for time sensitive data, such as voice and video (voice or video is transferred across a network).

In regards to Claim 16, Giroux teaches in column 3, lines 12-13, a connection admission controller computes the minimum bandwidth required for each service class (providing a communications network resource to a plurality of classes of use of a network, a different level of service being associated with each class of use).

Giroux also teaches in column 2, lines 11-24, a fair queue servicing arrangement in a multi-service class packet switched network, comprising a weighted fair queuing controller, and buffer means for receiving incoming packets in queues, characterized in that further comprises means for monitoring buffer usage for each queue, means for determining the bandwidth requirements of each class of service, and a service weights manager for dynamically modifying the weights of said weighted fair queuing controller means in response to said buffer usage and bandwidth requirements (estimating a demand for each class, allocating to each class a proportion of a network resource, a proportion allocated being dependent on an estimated worst case effective bandwidth demand for each class, and an allocation optimizing use of an available network resource while ensuring a level of service of each class is observed).

Giroux also teaches in column 2, lines 49-52, a service weight manager that dynamically modifies weights to be used by a WFQ Scheduler (providing to each class a proportion of network resource allocated to it).

Giroux fails to teach estimating a demand by computing two demand estimates of effective bandwidth for two different timescales, one of the demand estimates determining a short-term burstiness within a traffic envelope, and an other of the demand estimates determining a long term variance between traffic envelopes.

Qiu teaches in the Abstract, page 199, and a goal of admission control is to support quality-of-service demands of real-time applications via resource reservation, and Qiu teaches in the second and fifth paragraphs of the Introduction, page 199, extant algorithms employ user-specific traffic parameters to estimate aggregate resource demands, but this reliance on each flow's traffic parameters can render statistical services difficult to deploy, and Qiu presents an implementation of an MBAC algorithm for multiclass networks with link sharing and a development of a new theoretical framework of aggregate traffic envelops (estimating a demand).

Qiu teaches in the second and third paragraphs of section A of part II, page 200, a goal of a measurement methodology is twofold, where, first, by measuring a maximal rate envelope of an aggregate flow, capturing (computing an estimate for) a short time-scale (a timescale) burstiness (demand) of traffic, and where an envelope measures a short time-scale (a timescale) burstiness (demand) and autocorrelation structure of an aggregate flow (one of the demand estimates determining a short-term burstiness within a traffic envelope), and Qiu teaches in the second and fifth paragraphs of section A of

part II, page 200, measuring a variation of an aggregate flow's rate envelope (demand) to characterize (compute estimate for) longer time scale (a second timescale) fluctuations in traffic characteristics, and where a measuring of variability of an aggregate envelope (demand) over certain time slots to characterize (compute estimate for) a variation of an envelope (demand) itself over longer time scales (a second timescale) (a demand estimator for estimating a demand by computing two demand estimates for two different timescales).

Qiu teaches in second E of part III, page 207, a termporal correlation of successive traffic envelopes to capture traffic dynamics at time scales larger than that of an envelope and measurement window, and where successive traffic envelopes are correlated (and an other of the demand estimates determining a long term variance between traffic envelopes).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Qiu with the invention of Giroux since Qiu provides an algorithm for statistical services that overcomes the problems of algorithms that require acute reliance on each flow's traffic parameters and allows easier deployment of statistical services for applications that cannot accurately estimate their traffic parameters when a flow is first established and for flows with rate variations over multiple time scales that are not adequately characterized by standard traffic models, which can be introduced into the system of Giroux to aid in guaranteeing a desired Quality of Service for a service class that is beginning to experience traffic and for a

service class with rate variations over multiple time scales, improving the resource utilization efficiency in the system of Giroux.

Giroux fails to teach the greater of the two demand estimates giving the estimated worst case effective bandwidth demand, and a proportion allocated being dependent on the estimated worst case effective bandwidth demand.

Prasad teaches in column 6, line 53 to column 7, line 9, and in column 18, lines 47-67, and in column 19, lines 10-19, and in column 22, lines 23-51, and in FIGS. 1 and 6, a determination is made at the end of each measurement period, where multiple measurement periods are defined, such that shorter measurement periods are "nested" within longer periods, and the determination of the highest ABR flow rate plus (or minus) the surplus (or undersupply) bandwidth divided equally among the flows with the highest ABR rates is then determined from a sum of the actual cell rates of flows having a cell rate level faster than or equal to that associated with the expired measurement period, with the sum of saved cell rates obtained in a previous measurement period, for those flows associated with unexpired measurement periods, and FIG. 6 illustrates a exemplary set of nested measurement periods T_0, T_1, T_2, T_3 as may be used according to this second preferred embodiment of the invention, and in this example, measurement period T_2 includes four measurement periods T_1, and sixteen of the shortest measurement periods T_0, such that M=4, and longer measurement periods $T_k>3$ may be generated in a similar manner, and measurement intervals of differing duration are used to improve the responsiveness of the flow control process for high cell rate ABR flows, while ensuring that sufficient time is provided to receive and process

resource management (RM) cells for lower data rate flows, and preferably these measurement periods are "nested", such that the longer measurement periods are integral multiples of the shorter measurement periods, and an aggregate rate R_T of all flows F, at the expiration of measurement period T_{k^*}, may be approximated, and this approximation is an addition that is the sum of all current rate values R_k for levels k less than or equal to the level k* of the expiring measurement period k*, with all of the saved rate values SR_k for all higher levels k>k* (corresponding to measurement levels T_k not yet expired), and an estimate of the rates of flows F that have changed levels, and this estimate of the rates of changed-level flows is made by counting the differences between the saved and actual counts for each expiring level less than or equal to k*, each times the minimum rate RL_k for the associated level, and a bottleneck rate BR is then calculated using this approximation of aggregate rate R_T, and the bottleneck rate BR is then communicated by switch 8 (FIG. 1) to the source of flows F, as the value of the Explicit Rate (ER) field in backward-traveling RM cells associated therewith (two demand estimates of effective bandwidth for two different timescales, the greater of the two demand estimates giving the estimated worst case effective bandwidth demand, and a proportion allocated being dependent on the estimated worst case effective bandwidth demand).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Prasad with the invention of Giroux in view of Qiu since Prasad provides a switch and method that provides varying lengths of measurement periods for flows of differing cell rates, so that responsiveness and

stability may both be optimized (see Prasad, column 6, lines 20-45), which can be introduced into the system of Giroux in view of Qiu to allow accurate and stable transmission packets according to service class and to ensure stable optimization of dynamic allocation of bandwidth across multiple classes.

Allowable Subject Matter

Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

I. Arguments for Claim Rejection under 35 USC § 103

Applicant's arguments with respect to claims 9 and 16 have been considered but are moot in view of the new ground(s) of rejection.

Examiner notes that each of “a demand **estimator**”, “a dynamic resource **allocator**”, and “a communications network **element**” **of Claim 9**, and “a communications network **element**” **of Claim 16** are being viewed as a combination of hardware and software based on the specification, especially the third paragraph on page 17 of the specification.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Suni (Pub. No.: US 2002/0163887 A1)

Davison et al. (Patent No.: US 6,665,264 B1)

Knightly et al. (Patent No.: US 6,801,501 B1)

Knightly et al. ("D-BIND: An Accurate Traffic Model for Providing QoS Guarantees to VBR Traffic", 1997, IEEE, IEEE/ACM Transactions on Networking, Volume 5, Issue 2, pages 219 – 231).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA SMITH whose telephone number is 571-270-1826. The examiner can normally be reached on Monday-Friday, 10:30am-7pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chirag Shah can be reached on 571-272-3144. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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06-15-2010

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6-16-2010